SKIN GRAFTING

FOR SURGEONS AND GENERAL PRACTITIONERS

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CHAPTER VIII

GRAFTING FROM ANIMALS

The idea of obtaining grafts from animals, thus avoiding pain and inconvenience to the patient, is certainly attractive. If it could be demonstrated that such transplantations were sufficiently often successful, and that the new skin was as satisfactory as that obtained by other processes, zoögrafting would be the method of choice. Unfortunately the procedure is at best uncertain, so much so that Reclus has classed it among "laboratory experiments," rather than among useful operations. Colrat laid down the general rule that such grafts usually become absorbed, granulations sooner or later growing through them, although they may seem to thrive at first. This is undoubtedly going too far, as numerous instances have been recorded where the method has been of great service.

Cousin makes some interesting comparisons between the value of grafts obtained from man and from animals. He made 165 transplantations from frogs, chickens, guinea-pigs, and rabbits, out of which he had but 15 successes. In 122 human grafts, however, good results were obtained in 115.

Success has varied much in the hands of different operators; so much so that by some the method has been absolutely condemned, and by others praised beyond all reason. A partial explanation of this lies in the fact that many

results have been reported too soon, before time and exposure had tested the resisting powers of the new skin.

Zoögrafting possesses an advantage over transplantation from another person in avoiding the danger of transmitting disease; and where it would otherwise be necessary to call upon the patient's friends for epidermal donations, it is perhaps most in place. Even in these cases it is questionable whether it would not often be better to run the small amount of risk and obtain human skin from the bodies of recently dead infants, amputated limbs, circumcisions, etc., or from living individuals.

One of the first recorded instances of grafting from an animal to man, and certainly one of the most remarkable in medical literature, is said to have occurred in the seventeenth century. A surgeon replaced a defect in the scalp and skull with a skin-periosteum-bone graft from a dog; but under threat of excommunication, the Church compelled the unfortunate operator to remove the transplanted tissues, which had already grown in place.

Zoögrafts have been obtained by various operators from frogs, chickens, lizards, pigs, dogs, cats, rabbits, guinea-pigs, the lining membranes of eggs, etc. Frogs furnish, perhaps, the most reliable and most easily obtainable material, although Miles [1] considers it to be the least desirable of all.

GRAFTING FROM FROGS was performed by Allen, in 1884,[2] and by Baratoux and Dubousquet-Laborderie [3] a few years later. The skin of the abdomen is usually employed, but that from the back or any other portion of the

[1] Edinburgh Med. J., Sept., 1895.
[2] Lancet, Nov. 15, 1884.
[3] Le Prog. Med., Nov. 15, 1887.

body answers the purpose equally well. Smith [4] affirms that the dorsal skin is thicker and grows more satisfactorily than that from other parts. Small pieces can be removed, or long strips, which may afterward be divided if desirable. Nesterovsky [5] pinches up a fold of skin with forceps and snips off a piece the size of a finger-nail, which is a rapid and satisfactory method. Fowler [6] skins the entire frog, legs and all, in strips ¼ to ½ inch wide.

In order to render everything as aseptic as possible, the frog, after a preliminary scrubbing, may be immersed as far as the neck for five minutes in a solution of corrosive sublimate (Nesterovsky), or allowed to swim about indefinitely in a solution of boric acid (Polaillon).

The cuticle of frogs, as well as that of other animals and of man, may be preserved apart from the body for a number of hours; hence grafts wrapped in some waterproof tissue with moist gauze, to prevent drying, may safely be carried to patients at a distance (Allen).

The new skin soon becomes pinkish and so nearly translucent that one must observe rather closely at times to detect its presence; in fact, it occasionally seems almost to disappear, and then to reappear as a delicate film through which the red surface beneath can easily be seen. Should the grafts even vanish entirely, cicatrization is said to be promoted. The pigmentation, so universally present with frogs, disappears in a few days,—five, according to Smith; ten, according to Fowler,—but, nevertheless, for some reason the new skin remains somewhat darker than the surrounding cuticle.

[4] Boston Med. and Surg. Jour., Jan. 24, 1895.
[5] Brit. Med. Jour., June 1, 1889, p. 1246.
[6] Ann. Surg., Vol. 9, 1889, p. 179.

A soft, pliable covering is produced, which, were it only durable, would be all that could be desired; but unfortunately it has a tendency to ulcerate and disappear, which renders frog's skin inferior to that obtained from the human body. Even under the most favorable circumstances, great care must be given the soft and immature cuticle for at least three months.

Redard [7] was the first to use the skin of CHICKENS for grafting, and for a time this material became quite popular, although, like other forms of zoögrafting, it is now seldom resorted to. The soft, nude cuticle on the under surfaces of the wings was selected, and the fat carefully removed. When the grafts survived, they ultimately came to resemble to a great extent the normal surface of the body.

Altamirano [8] successfully grafted an ulcer with 20 pieces of COCK'S WATTLE. The circulation in these structures is so vigorous that one would expect comparatively good results.

Miles, of Edinburgh,[9] and a few months later, M. E. Van Meter, of Colorado,[10] employed with considerable success the skin of PUPPIES, Miles using the greyhound, and Van Meter the Mexican hairless puppy, which possesses a particularly soft and white integument. The cuticle of a young PIG has been utilized with satisfaction by Raven [11] and Hübscher.

Miles [12] has also transplanted from RABBITS and KITTENS. His method is to shave the abdomen, and if neces-

[7] Arch. Roum. de Med. et de Chir., Jan., 1888.
[8] Satellite of the Ann. Univ. Med. Sci., Oct., 1889.
[9] Lancet, Mar. 15, 1890, p. 594.
[10] Annals Surg., Aug., 1890, p. 136.
[11] Brit. Med. Jour., Nov. 3, 1877, p. 623.
[12] Edinburgh Med. Jour., Sept., 1895.

of extensive burns. Small pieces were placed 12 to 15 millimeters apart and covered with sections of tin foil 1 cubic centimeter square. An ingenious application of the method has been used by Berthold, in closing perforations of the tympanum (see grafting in connection with the ear). The procedure has been of value in filling defects in the conjunctiva, such, for example, as are produced by the removal of a pterygium.

sary the flanks, and remove the cuticle in strips from one to six inches in length and from one-half to one inch in width, avoiding the subcutaneous cellular tissues. It is perhaps unnecessary to curette the granulating surface, but it should be healthy. The grafts are pressed down firmly, with their edges together, and the dressing should not be disturbed for from forty-eight to seventy-two hours, and then with the greatest caution. Superficial sloughs and pustules may form. The latter should be opened at once. Granulations which show a tendency to grow through the new skin and destroy it should be removed with a sharp spoon. The color of the grafted skin soon becomes satisfactory, and sensation develops; hair does not grow, and there is no contraction. Miles reports four successes in 10 cases and only two absolute failures.

As a matter of interest only, it should be mentioned that skin has been successfully grafted from man to the lower animals.

E. Aievoli [13] made use of thin sections of the TESTES OF RABBITS for purposes of grafting in four cases, assuming that the testicle possesses a greater cellular activity than other portions of the body. The results were undoubtedly good, but it does not follow that they were better than could otherwise have been obtained.

The LINING MEMBRANE OF AN EGG furnishes a material for grafting which is easy to obtain and is sometimes efficacious, although the results are not so durable as they might be, in spite of the views of Watson and others to the contrary. Amat [14] achieved some success in this way in cases

[13] Cent. f. Chir., No. 14, 1891, p. 289—Med. Rec., Aug. 6, 1892, p. 164.
[14] Arch. d. Med. et de Pharm. Milit., Mar., 1895—Medicine, Oct., 1895.